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# The Missing Element of Knowledge Management: Social Computing



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**ABSTRACT:** *The paper aims to highlight the value that social computing can bring to Knowledge Management mainly its knowledge sharing process. The research is based on a systematic study of literature. Literature was examined to provide an understanding what social computing can offer to knowledge sharing.*

*Knowledge management (KM) was in full swing up to mid-90s. But due to globalisation and the increasing use of the Internet it has a period where practitioners and research community were less interested in KM. Traditional KM approaches could not solve efficiently the challenges of the 21<sup>st</sup> century organisations. KM practitioners and researchers were slow in recognising and providing new methodologies based on new developments in technologies. The lack of new methodologies impeded the value and importance of KM in organisations.*

*Social computing is an emerging field and its principles are in align with the theories of KM. The research has attempted to provide a link between KM and social computing. The research has pointed out where in KM the tools of social computing can be utilised.*

**Keywords:** Social Computing, Knowledge Sharing, Web 2.0, Knowledge Management

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## 1. Introduction

### 1.1 Knowledge Management

The growing need and importance of knowledge in organisation's success has led to the emergence of the Knowledge Management (KM) discipline. KM involves creating, capturing, organising, accessing and using knowledge (Soliman, and Spooner, 2000). There is no standard definition of Knowledge Management. However most of the definitions suggest that KM enables

organisations to improve performance and compete. People, processes and technology are key components of KM that have been pointed out by many researchers (Snowden, 2007; Stair and Reynolds, 2008; Edward, 2009). About the technology there are two different views. One view describes technology as a key part of KM and the other view describes it as an enabler rather than a part thereof. What is common in both views is that technology is important for KM. KM consists of different processes like creating, storing and sharing knowledge (Stair and Reynolds, 2008). Knowledge sharing is regarded as the most important process and exists in different KM models and theories (Al-Hawamdeh, 2003; Stair and Reynolds, 2008).

## 1.2 Knowledge Sharing

Hooff and de Ridder (2004) have pointed out knowledge sharing as consisting of two different processes: knowledge donating and knowledge collecting. Knowledge donating is defined as actively share ones knowledge with another person, and knowledge collecting is the process of asking others to share their knowledge. It is clear from Hoof and deRidder (2004)that knowledge sharing consists ofat least two entities:a knowledge provider and a receiver.

An entity may be an individual or an object like a computer machine. Knowledge (tacit or explicit) can be stored at different locations (Skyrme, 2001) for example, brain (tacit) and computers (explicit). Knowledge sharing provides many benefits to organisation for example, increase innovation and reduce costs of redundant learning (Scarbrough, 2001).

## 1.3 Social Computing and Web 2.0

Social media is an emerging technology with the potential to offer flexibility, adaptability and boundary spanning functionality to organisations (Yates and Paquette, 2011). Closely related to social media is Web2.0. Web 2.0 provides the ideological and technological foundations for social media (Kapla and Haenlein, 2010).From ideological perspective Web 2.0 allows contents to be modified by all users in a participatory and collaborative fashion (Kaplan and Haenlein, 2010). It offers tools such as blogs and micro blogs, wikis, social tagging, social bookmarking, social networking sites, mashups and virtual spaces. Tools of Web 2.0 are used to create different types of environments like forums, blogs and discussion boards where the collaborative and interactive behaviours take place.If the members of these environments share a common interest then it can be termed as Virtual Communities (Wenger et al., 2002). Virtual communitiesempower and motivate employees to share and contribute to the benefit of an organisation (Yan, Zha and Yan, 2014). People's behaviour, power structures and relationships are created in real communities. The same phenomenon can happen in the online world as well. The online behaviour of the Internet users results in new power structures and relationships and this is referred to as social computing (Li, Charron and Favier, 2006).

Margaret Rouse points out that in contrast to *personal computing* which defines the behaviour of isolated users, social computing is the collaborative and interactive aspect of online behaviour. Social computing exists because of the use of Web 2.0 features.

The table 1 listed below describes the tools of Web 2.0

## 2. Challenge to Traditional KM

The long established KM approaches, communities of practice, lessons learned and transfer of best practices can be termed as traditional KM. These approaches have a proven record of success and still used at large; for example, lessons learned is popular in the army. The question is, can these approaches be implemented in situations where people are remote from each other? The answer would be that traditional KM approaches will struggle (O'Dell and Hubert, 2011).

Generally the aim of KM is to connect people to people to share knowledge. People are the main source of knowledge and they might be staff, customers, and suppliers. In this globalised world people (staff and customers etc.) might be hundreds of miles awayand as a resulttraditional KM approaches would not be very effective. Employees in an organisation may be working from remote locations or they may prefer to work from home but if they need any help in an issue and cannotaccess company knowledge resources then KM programme is not efficient. This is a challenge that traditional KM is facing and is depicted in the figure listed below. In the figure 1, red arrows represent knowledge sharing barriers of remote employees between each other and with the traditional KM which has limited boundary.

## 3. How does the Bond between Social Computing and KM Begin?

Large organisations in both public and private sectors (for example BP, NASA, NHS Scotland, Buckman laboratories,Global

<b>Web 2.0 Tools</b>	<b>Description</b>
<b>Blogs</b>	<b>Online record and can be edited only by the author.</b>
<b>Micro blogs a one-to-many format.</b>	<b>Short blog broadcasts for example Twitter that publishes contents to the point in</b>
<b>Wikis</b>	<b>Systems that allow sharing documents, editing and publishing. It is like an online document or discussion; which allows many authors to edit.</b>
<b>RSS</b>	<b>Really Simple Syndication allows people to subscribe to online sources of news, blogs, podcasts, and so forth, and receive alerts.</b>
<b>Social networking skills, knowledge, preferences and talents.</b>	<b>Systems that register users to become its member to allow them to share their</b>
<b>Social bookmarking, folksonomies and collaborative tagging.</b>	<b>An online, user-defined taxonomy system for bookmarks. When applied to individuals content items, such taxonomy is sometimes called a folksonomy, and the bookmarks are referred to as tags. Tagging may also refer to the metatags applied by users, or automatically generated into tag clouds. (O'Dell and Hubert, 2011)</b>
<b>Podcasts</b>	<b>Audio and video media files that can be downloaded onto mobile devices and computers.</b>
<b>Expertise location</b>	<b>An integrated approach that involved people, processes, technology and content. It is designed in such a way that people can easily find information about others, identify experts, and identify participants for projects requiring specific expertise.</b>
<b>Collaboration tools</b>	<b>A wide range of applications that enable teams and communities to work together. These can be synchronous or asynchronous. Microsoft SharePoint is a popular example of such tools.</b>
<b>Mashup</b>	<b>Combing two of more media sources to create a new content source.</b>
<b>Virtual spaces</b>	<b>Simulations of reality that help users interact and retrieve information virtually.</b>

Table 1. Tools of Web 2.0

Computing and Image Solutions) have successfully developed and implemented tailor-made knowledge management systems for their organisations. These are national and international companies which have employees miles away from each other. The systems they developed meet their needs. However, many organisations small or large may not be able to afford to develop their own KM systems. Questions that can be asked are (a) do we really need to develop a system for KM? and (b) is there an existing technology which can be used?

O'Dell and Hubert (2011) mentioned that in few years tremendous changes have occurred around KM area. Examples are rising internet and broadband access, the explosion of mobile devices and smart phones, the continued rise in virtual work and global teams, the international equalisation of competitive prowess and knowledge, the decline of readership for the printed word, and the rise of digital readership. These changes have enhanced the promise and practice of KM (O'Dell and Hubert, 2011).

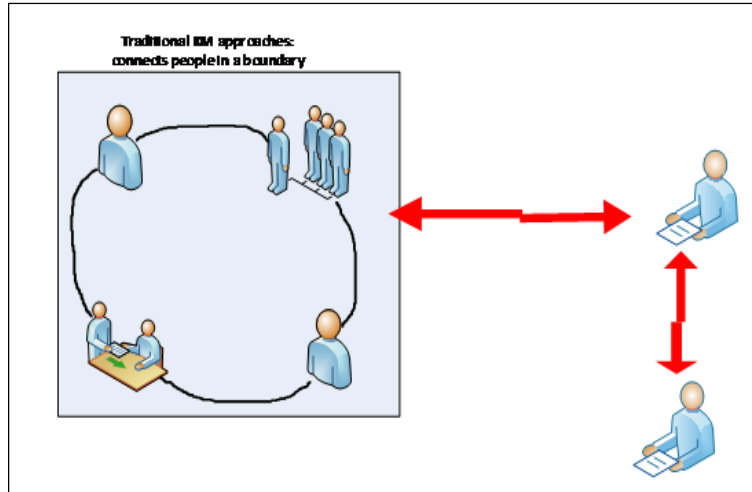


Figure 1. Traditional KM

In the last half decade social computing has increased dramatically. In 2010, there were about 400 million Facebook users. In 2014, the number goes to 1.23 billion users. A similar increase has been noted in other social media like LinkedIn. According to Statista there were about 70 million users of LinkedIn in 2010; it increased to about 364 million users in 2015. Different statistics about these social media sites show that apart from an increase in the number of users, sharing contents and updates increased as well. These statistics show that people spend a lot of time using social media.

Employees who use social sites like Facebook must be comfortable in using it and may prefer using it for sharing knowledge rather than a new system. A common thing between social computing and KM is that they rely on people. For example, a KM programme can fail if experts are not willing to share it with others or a social network can fail if people do not use it. The link between the two fields was realised by academics around the early part of the first decade of 2000. In this regard, Carlisle (2004) provided a model of knowledge sharing which potentially explains how users rely on social technology to efficiently share knowledge. Levy (2009) provided a clear comprehension of the implications of social computing on KM. Many academics and practitioners agree with O'Dell and Hubert (2011) that 'if we didn't have social technologies, then we would have to invent it for KM'. In the next section the research will look at some of the key research conducted between the social computing and KM.

#### 4. Existing Knowledge

Systematic literature study was conducted. Key words were identified for literature search. Some of these words were: social computing and knowledge sharing, social computing and knowledge management. The key databases were identified and year of search were specified. The systematic search of the literature pointed out an interesting result. It was noted that the number of studies conducted about social computing and knowledge management increases with time. The following table 2 lists the results of the search in some databases.

	2000-2005	2005-2010	2010-current
<b>Emerald</b>	<b>5,806</b>	<b>7,926</b>	<b>9,176</b>
<b>IEEE explore</b>	<b>34</b>	<b>231</b>	<b>341</b>
<b>Google Scholar</b>	<b>9,500</b>	<b>13,200</b>	<b>16,00</b>

Table 2. results of keywords search

One of the key studies that was noted is from Paroutis and Alya Al Saleh in 2009. They investigated the determinants of Web 2.0 tools for sharing knowledge. They interviewed users and non-users of Web 2.0 tools and provided a list of determinants: history, outcome, expectations, perceived organizational/management support and trust. Boatening and Mbarika (2010) claim that Web 2.0 facilitates knowledge creation and sharing by involving, engaging and empowering people, and by creating a collaborative environment for social interaction between those who need to seek knowledge and those who hold the knowledge.

Another useful research in this aspect is an action research from Yates and Paquette (2011). The research was conducted about the use of social media for KM purposes in the 2010 Haitian earthquake. They pointed out that social media helped knowledge sharing by increasing knowledge reuse within staff and by getting rid of dependency on formal liaison structures (both in terms of personnel and systems) between staffs. This research is a good example which highlights the importance of social media for KM purposes but does not provide any framework of how to use social media for knowledge sharing purposes in organisations. It is worth noting that the situations in natural catastrophes are totally different from those of a normal day of life. In natural catastrophes, people are more willing to help and therefore they may be more willing to share their expertise and knowledge to help. Yates and Paquette's (2011) research needs to be tested in a normal situation as they did not take into consideration that Haitian was not a normal one.

KM Applications	Web 2.0/Social computing Applications
Customer Relation Management (CRM) Business Intelligence	Google Analytics, Google Forms, Tagging
Document Management, Knowledge Repositories, Content Management	Web Portal, OpenCMS , Google Video, Youtube, Flickr, Wikis
Best practises, Quality Management, Process Automation	Brandkore
Skills Development, Staff Competencies, Learning, Teaching, Training	Google Presentation, Slide Share, Google Video, WizIQ, Teamviewer , Meetgreen
Communities, Collaboration, Discussion Forums, Networking, Virtual Teams, Multi-disciplined Teams	Google Spreadsheet, Google Docs, Google Calendar, Mind42, Google Mail, Google Talk, Skype, Facebook, Blogspot, Twitter, Wikis

Table 3. Source -Thomas Bebensee et al. (2011)

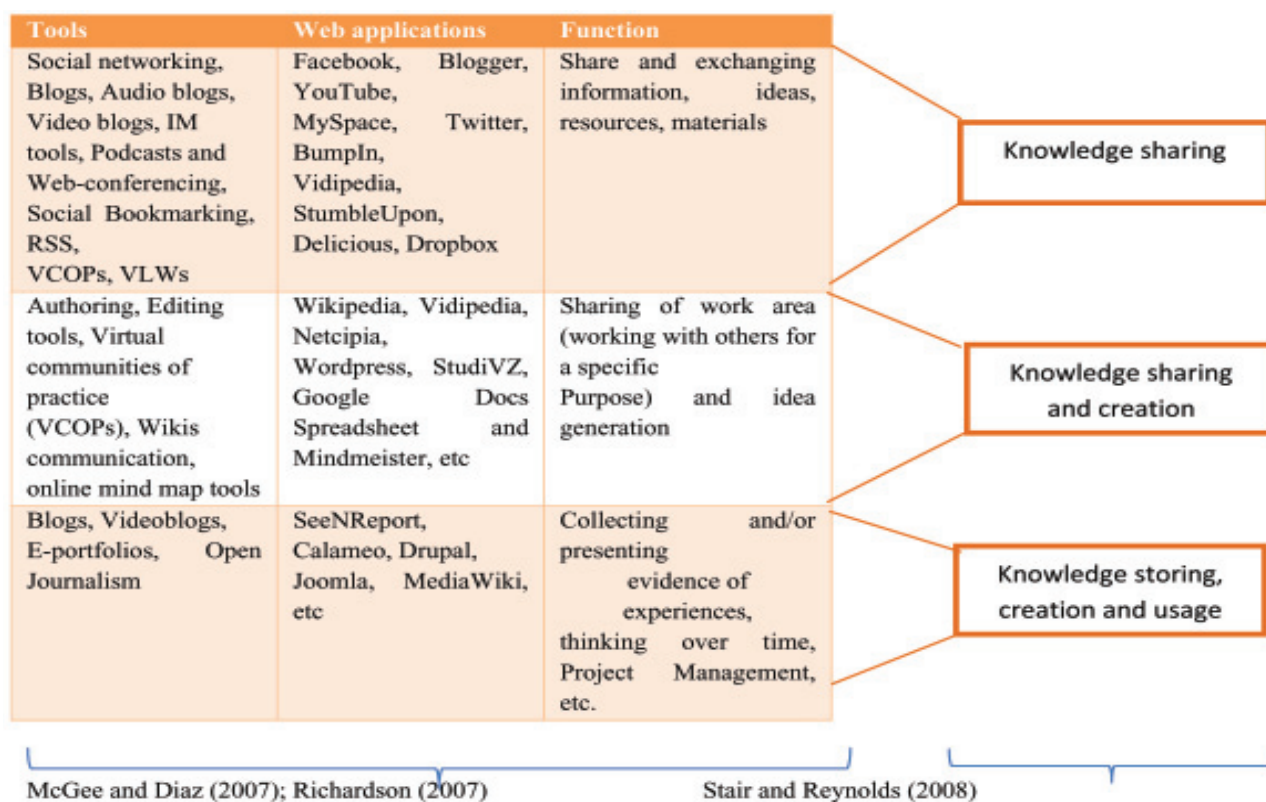


Figure 2. Link of Social computing tools and KM



Thomas Bebensee et al. (2011) performed a detail study and provided a list of KM applications which can be achieved by using social computing tools. The table listed below shows this information. A similar list of matching KM applications against social computing ones has been provided by other researchers as well, for example Levy (2009).

It is difficult to categorise the research conducted between Social Computing and Knowledge Management. However, most of the studies fall into two categories. The first category refers to studies which looked at the relationship between knowledge management and a specific tool of social computing like wiki (Minocha and Thomas, 2007; Hester, 2010). The second category consists of studies between social computing and a process of KM like knowledge creating in a specific type of organisation like health services or oil and gas (Paroutis and Alya Al Saleh, 2009; Boatening and Mbarika, 2010; Yates and Paquette, 2011; Paton, et al. 2011).

The study of literature shows that most of the studies that looked at the relationship between social computing and knowledge management tested their concepts only on one type of organisation like IT. It is a common belief among academics that a theory may be true in one type of organisation but it may fail completely in another type of organisation unless you test it on a different type of organisation. The literature lacks research that has gathered data from different types of organisation to test their models or theories for generalisation.

## 5. Conclusions

Organisations must have some mechanisms that should establish relationships between individuals and connect them to work collectively for general organizational goals. Organizations learn and create knowledge through dynamic interactions between employees (Nonaka and Takeuchi, 1995). If employees are socially interconnected it will not only transform knowledge between explicit and tacit forms (Nonaka and Takeuchi, 1995) but it may also increase availability of knowledge at the individual and organisational levels.

The use of social computing tools like Facebook and blogs for social interaction has increased dramatically in the last decade. For example, about 1.23 billion users of Facebook share more than 3.5 billion content weekly. The rise in the usage of social computing tools and its different aspects like forums have provided opportunities to connect employees socially with each other though they could be hundreds of miles apart. These connections between users of the Internet may form Virtual Communities (VCs) (Horrigan et al. 2001. Kim & Jin, 2006). Virtual communities are 'socio-technical system' (Preece, 2000). The purpose of all VCs is knowledge sharing (Camison et al., 2009). It is pointed out that a VC provides the social and technological aspects for the sharing of knowledge (Camison et al., 2009). Trust plays a key role for VCs to be successful in sharing knowledge (Usoro and Khan, 2012).

It may not be a problem for large organisations to develop tailor-made knowledge sharing systems. For SMEs the cost may be a lot because they face a lot of financial hurdles which is categorised into internal and external by Aizhen and Lianying (2011). Social computing tools may save a lot for both small and large organisations if they use it to establish KM in their organisations. The organisation needs to look into key issues like privacy, security and ethics before introducing social computing for knowledge sharing in their organisation.

Features of social computing tools like sharing of idea, making groups, taking part in discussions, sharing of documents and sharing of experience are very similar to the aims of KM processes in an organisation (Levy, 2009; Thomas Bebensee et al., 2011). The diagram listed below sums the link between social computing tools and KM very well. McGee and Diaz (2007) and Richardson (2007) have produced a table which lists functions against the tools and web applications. These functions show resemblance to KM processes and functions. These functions are matched against the KM processes provided by Stair and Reynolds (2008). It shows that KM processes can be performed using social computing tools.

The two areas can offer to each other a lot; however, a comprehensive study is required. The study must aim to provide a model that should be used as guidelines for the implementation of social computing in organisations for sharing knowledge.

## 6. Summary

In this competitive economic environment, survival is vital for organisations. Knowledge is considered a key to survive and compete. As a result of the value of knowledge, organisations need to have strategies on how to create, share, store and utilise

knowledge.

The research has looked at implications of social computing tools for the knowledge management strategies in organisations. The research identifies a key problem in traditional KM. The traditional KM is good for face to face environment but it does not have solutions for situations when employees are miles away from each other. Once KM was quite popular but then it loses its attention because it was criticised for its limitations. It is believed that social computing may solve the problem of KM.

In this regard, most of the existing research falls into two: (1) research which studied relationship between knowledge management and a specific tool of social computing like wiki, and (2) studies between social computing and a process of KM like knowledge creating in specific types of organisation like health services or oil and gas.

The research highlighted some links by looking at functions that can be performed by social computing tools and processes of KM. The identified gap in knowledge will be filled in future.

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## Appendix 1

Description of Study	Findings/Outcome	Source	Limitations
<b>Studied the effectiveness of Wiki as a collaborative learning tool</b>	Wiki is an effective collaborative learning tool. However, socialization among the participants needs to be ensured for effective collaboration.	Minocha and Thomas, 2007	
<b>Studied enabling customer centricity using Wikis</b>	An examination of three cases where Wiki is in use to promote customer centrality revealed six characteristics that affect customer engagement - community custodianship, goal alignment among contributors, value-adding processes, emerging layers of participation, critical mass of management and monitoring activity.	Wagner and Majchrzak, 2006	
<b>Conceptually evaluates Wikis potential for teaching and learning</b>	Conceptually evaluates Wikis' potential for teaching and learning.	Mindel and Verma, 2006	
<b>Evaluates potential of Wikis in diminishing knowledge acquisition bottlenecks through conversational KM</b>	Knowledge acquisition through collaboration and conversation facilitated by Wikis can lead to a super linear knowledge asset growth and continuous quality improvement.	Wagner, 2006	
<b>Studied the acceptance and usage of blogs</b>	The results indicated that ease of use and enjoyment, and knowledge sharing were positively related to attitude toward blogging. On the other hand, social factors (community identification) and attitude toward blogging significantly influenced a blog participant's intention to continue to use blogs.	Hsu and Lin, 2007	
<b>Studied the Web 2.0 technology as a means to achieve collaborative intelligence</b>	Theoretically proved that Web 2.0 can facilitate collaborative intelligence.	Lee and Lan, 2007	
<b>The impact of Social Networking 2.0 on organisations</b>	The impacts (both negative and positive) of Social Networking 2.0 were identified.	Anria Sophia van Zyl, 2008	Methodology: only the current literature available were utilised to create definition for Social Networking 2.0. Then a set of criteria were created to determine whether a social networking application complies with the definition and falls within the scope of this research.
<b>Determinants of knowledge sharing using Web 2.0 technologies</b>	Explored the key reasons for and barriers to employees' active participation on its various platforms within a large multinational firm.	Sotirios Paroutis and Alya Al Saleh 2009	11 people were included in an interview at which only 5 were

	Uses insights from both users and non-users of Web 2.0. For this, the four key determinants identified were history, outcome, expectations, perceived organisational/management support and trust.		uses of Web 2.0 tools while 6 were non-users.
<b>Developed a theoretical model to argue for potential benefits of sharing deeper structural knowledge in an electronic document repository through social tagging and personal document hierarchies</b>	Exploratory study confirms the benefits of sharing personal hierarchies in a collaborative knowledge work environment.	Wu and Gordon, 2009	
<b>Studied the potential of Wiki for IS research collaboration</b>	Conceptually proved that Wikis can effectively facilitate research collaboration.	Kane and Fachman, 2009	
<b>Studied Web 2.0 for collaborative knowledge engineering</b>	Developed a Web 2.0 approach to collaborative knowledge engineering.	Richards, 2009	
<b>When Web 2.0 becomes an organizational learning tool: evaluating Web 2.0 tools</b>	Web 2.0 facilitates knowledge creation and sharing by involving, engaging and empowering people, and by creating a collaborative environment for social interaction between those who need to seek knowledge and those who hold the knowledge.	Richard Boateng, Victor Mbarika, and Carlos Thomas 2010	The article provides only recommendations to organisations for the potential use of Web 2.0 tool instead of providing a framework.
<b>Social Computing and Immigrants and Ethnic Minorities: Usage Trends and Implications</b>	Social Computing (Web 2.0 Skyblog, Youtube, etc) as new field of investigation opens up at this level.	Dana Diminescu, Mathieu Jacomy and Matthieu Renault, 2010	
<b>Social Networks and Information Systems: Ongoing and Future Research Stream</b>	Studied the impact of new IT capabilities for the increased interest in network analyses of organizations in terms of improvements in analysis techniques, new ways to generate and maintain connections within and between social units, and new social connection-focused IT capabilities.	Harri Oinas-Kukkonen, Kalle Lyytinen, Youngjin Yoo, 2010	
<b>Increasing collaborative knowledge management in your organization: characteristics of wiki technology and wiki users</b>	Examines characteristics of Wiki technology and wiki users in an effort to uncover factors facilitating increased adoption and usage of Wiki technology as a collaborative knowledge management tool.	Andrea J. Hester, 2010	
<b>Towards a framework for educational affordances of blogs</b>	This study has made theoretical, empirical, and practical contributions to the research and practices related to educational blogging. And also proposed a framework for educational blogging and used it to examine extent to which blogs could	Liping Deng, Allan H.K. Yuen (2010)	



	support pre-service teachers during their fieldwork.		
<b>Leadership 2.0 in Action: a Journey from Knowledge Management to "Knowledging"</b>	<p>This study proposes that:</p> <ul style="list-style-type: none"> <li>• The foundation of Knowledge must be on sound principles of communication.</li> <li>• SMM (Sense-Making Methodology ) provides an avenue that allows the mindful design of tools that are actually communicative and dialogic so they can deal with the needs of all working people in an organisation.</li> <li>• A new kind of Leadership 2.0 that does more than call for dialogue but implements in ways that permit users to see how knowledge is communication-based and how it involves more than sharing but reflecting and learning as well.</li> </ul>	Cheuk, B., & Dervin, B. (2011)	SMM does not provide a technique to propose a single solution for all. Rather, it provides only a support of assumptions and a set of ideals that specialists can draw upon in their designs
<b>Experience in the Use of Social Media in Medical and Health Education</b>	This study provides a concept of using social media as a tool for learning in educational projects and advised educators to use social media in their educational projects. The use of social media for educational purposes will have distinctive advantages over non-social educational tools. Using social media tools will enhance the ability of students to make friends, find mentors and hence virtually build connections with them.	Chris Paton, Panagiotis Bamidis, Gunther Eysenbach, Margaret Hansen, Miguel Cabrer. 2011	
<b>Organizational Social Computing and Employee Job Performance, the Knowledge Access Route.</b>	Studied the uses of organizational social computing and found that it is positively associated with access to knowledge which in turn is positively related to job performance at varying degrees.	H Ali-Hassan, D Nevo, H Kim Jan. 2011	